

# Work Order ID 54173

December 2, 2009 10:02:51 AM



Page 1

Item ID: 41232-200-003-001

Accept



Setup Start



Revision ID: IR

Stop



Item Name: Spring (Step Actuator)

100

Start Date: 12/02/09 Start Qty: 24.00



Cust Item ID:

Required Date: 12/04/09 Req'd Qty: 24.00



Customer:

Reference:

Approvals:

Process Plan:

*W*

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start



Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

41232-200-003

Rev IR

100

0.00



PURCHASING

Purchasing

Memo

0.00

Purchasing

Issue P/O: *10874* Fabricate as per Dwg 41232-200-003 Possible Supplier: VICTORY SPRING Material release note is required

*Pl 0912-2 100*  
*(54)*

110

Receive & Inspect for Damage & Mat'l Certs

0.00



Packaging

Memo

0.00

Packaging

Ensure material certification is attached

*\* See Attached E-mail for mat. upgrade S106105*

*P19/12/29 (154)*

120

QC6- Inspect dimensions to drawing

0.00



QC

Memo

0.00

Quality Control

*27 S106105*

*counter*  
*(7104)*

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Page 2

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Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

130

Identify as per dwg & Stock Location: 365

0.00



Packaging

Memo

0.00

Packaging

140

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control



Setup Start



Stop



Cust Item ID:

Customer:

10/1-5

104x

SP

10.01.05

10.01.05

# Picklist Print

December 2, 2009 10:02:50 AM

Page 1

Work Order ID: 54173

Parent Item: 41232-200-003-001RevIR

Parent Item Name: Spring (Step Actuator)


Comments:

Start Date: 12/02/09

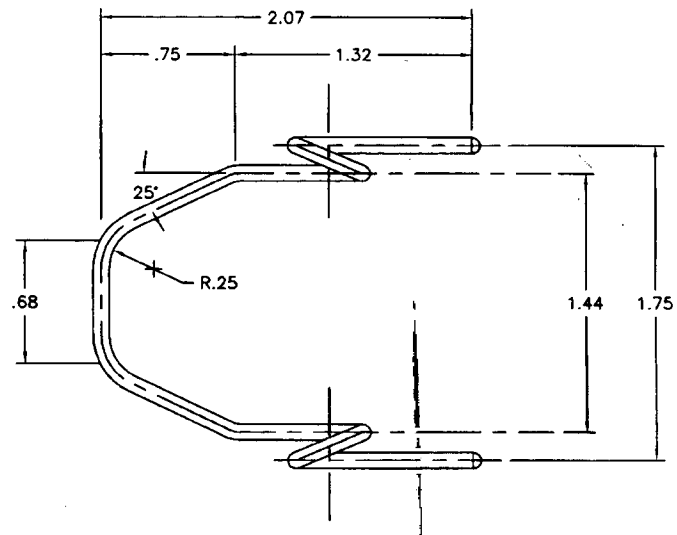
Required Date: 12/04/09

Start Qty: 24.00

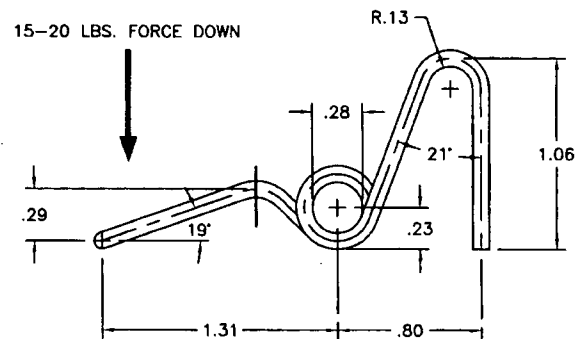
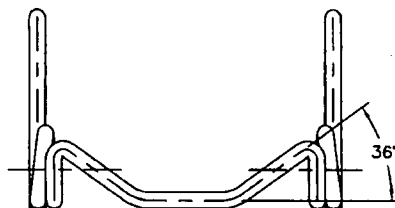
Required Qty: 24.00

| Component Item ID/<br>Item Name  | Replacement<br>Item ID | Mfg/<br>Purch | Bin<br>Item | Primary<br>Location | Last<br>Location | Route<br>Seq ID | Unit of<br>Measure | Qty on<br>Hand | Remaining<br>Qty To Pick | Qty<br>Issued | Date<br>Issued | Status |
|--|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|--------------------------|---------------|----------------|--------|
| 41232-200-003-001P   |                        | Purchased     | No          |                     |                  |                 | Each               | 0.0000         | 24.0000                  |               |                |        |
|  |                        |               |             |                     |                  |                 |                    |                |                          |               |                |        |
| Spring (Step Actuator)   |                        |               |             |                     |                  |                 |                    |                |                          |               |                |        |

12/12/09 107



ub  
54173



-001 SPRING

|  |  |                    |  |                                 |  |                        |  |                    |  |                        |  |
|--|--|--------------------|--|---------------------------------|--|------------------------|--|--------------------|--|------------------------|--|
|  |  | -001               |  | OIL TEMPERED SPRING WIRE, .0910 |  | GIBBS WIRE & STEEL CO. |  | ASTM-A-229-93      |  |                        |  |
|  |  | PART NO.           |  | NAME                            |  | STOCK SIZE             |  | MATERIAL           |  | ZONE                   |  |
|  |  | NO. REQ'D PER ASSY |  | LIST OF MATERIAL                |  |                        |  |                    |  |                        |  |
| PROPRIETARY RIGHTS NOTICE  |  |                    |  | UNLESS OTHERWISE SPECIFIED      |  | DRAFTSMAN D. NELSON    |  | 5/29/02            |  | TITLE                  |  |
| THESE DATA ARE PROPRIETARY TO GIBBS WIRE & STEEL CO. DISCLOSURE, REPRODUCTION, OR USE OF THESE DATA FOR ANY PURPOSE IS FORBIDDEN WITHOUT WRITTEN AUTHORIZATION FROM GIBBS WIRE & STEEL CO. THE FOREGOING DOES NOT APPLY TO VENDOR PARTS. |  |                    |  | X.±.1                           |  | CHECK D. MURPHY        |  | 5/29/02            |  | SPRING                 |  |
|  |  |                    |  | XX.±.03                         |  | STRESS                 |  |                    |  | DWG. SIZE C            |  |
|  |  |                    |  | XXX.±.010                       |  | PROL. ENGR.            |  |                    |  | SCALE 2:1              |  |
|  |  | -001               |  | 2                               |  | 41232-000-001          |  |                    |  | DWG. NO. 41232-200-003 |  |
|  |  | DWN. NO.           |  | REQ'D FOR ASSY                  |  | NEXT ASSEMBLY          |  | MIL.               |  | REV. IR                |  |
|  |  |                    |  |                                 |  |                        |  | HEAT TREAT         |  | FINISH                 |  |
|  |  |                    |  |                                 |  |                        |  | Era Aviation, Inc. |  |                        |  |

**Chris Provencal**

**From:** David Shepherd [dshepherd@dartaero.com]  
**Sent:** December 8, 2009 11:53 AM  
**To:** 'Chris Provencal'  
**Subject:** RE: material substitution for # 41232-200-003-00IP Spring,  
 Chris,

For the reasons you have listed below, I believe this is an acceptable substitution.

David

---

**From:** Chris Provencal [mailto:cprovencal@dartaero.com]  
**Sent:** Monday, December 07, 2009 9:03 AM  
**To:** 'David Shepherd'  
**Subject:** FW: material substitution for # 41232-200-003-00IP Spring,

David,

For the ERA step actuator spring, they want to substitute the dwg's "Oil Tempered Spring Wire ASTM A229" with "Music Spring Wire ASTM A228".

The strength values are given below. ASTM A229 has two "classes" of spring steel, the dwg doesn't specify. It appears that music wire is made to a higher spec, with slightly higher strength and tighter tolerances.

|           | ASTM A229                              | ASTM A228 |
|-----------|--|-----------|
| FTu (ksi) | 230-260 (Class 1)<br>261-291 (Class 2) | 276 -305  |
| +/-OD     | 0.002                                  | 0.001     |
| Max Seam  | 3.5% OD                                | 2% OD     |

I think it's an acceptable substitution.

-Chris

THIS IS THE OK  
 TO SUB SPRING  
 MAIL ATTACH  
 IS WLO / P/D

---

**From:** Chantal Lavoie [mailto:clavoie@dartaero.com]  
**Sent:** December 7, 2009 7:31 AM  
**To:** 'L Lacelle'  
**Cc:** chrisp@dartaero.com; 'Mike Petsche'  
**Subject:** FW: material substitution for # 41232-200-003-00IP Spring,

Hey Guys,  
 Could you please let me know if we are able to use this material as a substitute? We need those spring a.s.a.p.  
 Please advise.  
 Thanks  
 Chantal

— Chris

**PACKING SLIP**

20105

#2, 6104 - 82 Ave  
Edmonton, AB T6B 0E7  
t + 780 442 4020  
f + 780 466 8000

BILL TO: Dart Aerospace Ltd.  
1270 Aberdeen St.  
Hawkesbury ON K6A 1K7

SHIP TO:

| DATE      |   | ORDER No. |         | SHIP VIA |        |
|-----------|---|-----------|---------|----------|--------|
| 23-Dec-09 |   | 10874     |         | puro AIR |        |
| QUANTITY  | DESCRIPTION                               |           |         | UNIT     | AMOUNT |
| 104       | 41232-200-003-001P torsion spring, VIC843 |           |         |          |        |
| GST #     | TERMS                                     | SUBTOTAL  | FREIGHT | GST      | TOTAL  |
| 854454527 | NET 30 DAYS                               |           |         |          |        |



Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7  
Tel: 613 632 9577  
Fax: 613 632 1053

\*\*\*PO REPRINT\*\*\*

Purchase Order ID PO10874

Purchase Order Date 12/02/09

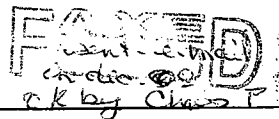
PO Print Date 12/09/09

Page Number 1 of 1

Order From :

VC-VIC002

VICTORY SPRING LTD.  
#2 6104 - 82 AVE.  
EDMONTON, AB T6B 0E7  
CA



Contact Name  
Vendor Phone 866 230 5312  
Vendor Fax 866 230 5338  
Vendor Account Nbr

Buyer Chantal Lavoie  
Requisition Nbr  
Tax Resale Nbr 10127-2607  
Terms Net 30  
Currency CAD  
FOB

Ship To : DART AEROSPACE LTD 1270 ABERDEEN  
HAWKESBURY, ON K6A 1K7  
CANADA

| Line Nbr | Reference<br>Revision ID<br>Vendor Part Number | Description/<br>Mfg ID | Req Date/<br>Taxable | Req. Qty/<br>Unit of Measure | Ship Method     | Unit Price | Extended<br>Price |
|----------|--|------------------------|----------------------|------------------------------|-----------------|------------|-------------------|
| 2        | 41232-200-003-001P                             | Spring (Step Actuator) | 12/14/09<br>Yes      | 100.00<br>Each               | FedEx Overnight | \$16.2400  | \$1,624.00        |

Special Inst: AS PER DRWG 41232-200-003-001  
REV: IR B 54173  
MATERIAL: MUSIC WIRE SPRING  
STEEL ASTM-A228

PO Total: \$1,624.00

CERTIFICATE OF CONFORMITY  
REQ'D UPON DELIVERY

revised QTY  
+  
revised material

Change Nbr: 4

Change Date: 12/09/09

No substitution or deviation without  
consent.  
Certificate of Conformity or Material  
Certification required when applicable

## MATERIAL CERTIFICATION

| REPORT FOR: Dart Aerospace  | DATE: 1/4/2010             |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
|---|----------------------------|----------|----------|----------------------|-------------------|-------------------|----------------------------|----------------------|-----------|--------------|---------------|--------------------|--|------------|--|------------|--|-----------------------|--|------------------------|--|--------------------|--|---------------------|--|-----------------------|--|---------------------|--|--------------------|--|-----------------|--|----------------|--|----------------|--|------------|--|
| PART/DRAWING #: 41232-200-003-001P  | PO #: 10874                |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| SPRING DESCRIPTION: Torsion Spring  | QUANTITY: 104              |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| MATERIAL GRADE: Music Wire Spring ASTM A228   |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| <p>PROPERTIES:</p> <table> <thead> <tr> <th>Chemical</th> <th>Physical</th> </tr> </thead> <tbody> <tr> <td>Aluminum: (Al) 0.001</td> <td>Size: 0.092" Dia.</td> </tr> <tr> <td>Carbon: (C) 0.780</td> <td>Tensile: 281,600 / 284,900</td> </tr> <tr> <td>Chromium: (Cr) 0.070</td> <td>Hardness:</td> </tr> <tr> <td>Cobalt: (Co)</td> <td>Heat # W11883</td> </tr> <tr> <td>Copper: (Cu) 0.040</td> <td></td> </tr> <tr> <td>Iron: (Fe)</td> <td></td> </tr> <tr> <td>Lead: (Pb)</td> <td></td> </tr> <tr> <td>Manganese: (Mn) 0.560</td> <td></td> </tr> <tr> <td>Molybdenum: (Mo) 0.002</td> <td></td> </tr> <tr> <td>Nickel: (Ni) 0.070</td> <td></td> </tr> <tr> <td>Nitrogen: (N) 0.004</td> <td></td> </tr> <tr> <td>Phosphorus: (P) 0.009</td> <td></td> </tr> <tr> <td>Silicon: (Si) 0.210</td> <td></td> </tr> <tr> <td>Sulphur: (S) 0.004</td> <td></td> </tr> <tr> <td>Tin: (Sn) 0.003</td> <td></td> </tr> <tr> <td>Titanium: (Ti)</td> <td></td> </tr> <tr> <td>Vanadium: (Va)</td> <td></td> </tr> <tr> <td>Zinc: (Zn)</td> <td></td> </tr> </tbody> </table> |                            | Chemical | Physical | Aluminum: (Al) 0.001 | Size: 0.092" Dia. | Carbon: (C) 0.780 | Tensile: 281,600 / 284,900 | Chromium: (Cr) 0.070 | Hardness: | Cobalt: (Co) | Heat # W11883 | Copper: (Cu) 0.040 |  | Iron: (Fe) |  | Lead: (Pb) |  | Manganese: (Mn) 0.560 |  | Molybdenum: (Mo) 0.002 |  | Nickel: (Ni) 0.070 |  | Nitrogen: (N) 0.004 |  | Phosphorus: (P) 0.009 |  | Silicon: (Si) 0.210 |  | Sulphur: (S) 0.004 |  | Tin: (Sn) 0.003 |  | Titanium: (Ti) |  | Vanadium: (Va) |  | Zinc: (Zn) |  |
| Chemical  | Physical                   |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Aluminum: (Al) 0.001  | Size: 0.092" Dia.          |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Carbon: (C) 0.780   | Tensile: 281,600 / 284,900 |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Chromium: (Cr) 0.070  | Hardness:                  |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Cobalt: (Co)  | Heat # W11883              |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Copper: (Cu) 0.040  |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Iron: (Fe)  |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Lead: (Pb)  |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Manganese: (Mn) 0.560   |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Molybdenum: (Mo) 0.002  |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Nickel: (Ni) 0.070  |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Nitrogen: (N) 0.004   |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Phosphorus: (P) 0.009   |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Silicon: (Si) 0.210   |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Sulphur: (S) 0.004  |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Tin: (Sn) 0.003   |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Titanium: (Ti)  |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Vanadium: (Va)  |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |
| Zinc: (Zn)  |                            |          |          |                      |                   |                   |                            |                      |           |              |               |                    |  |            |  |            |  |                       |  |                        |  |                    |  |                     |  |                       |  |                     |  |                    |  |                 |  |                |  |                |  |            |  |

Certified by: Chris Burrows

Victory Spring Ltd. certifies this to be a true & accurate copy of the original contained in the company records.